

CLAIMS

What is claimed is:

1 1. A snap ring, comprising:
2 a ring having an interior contour that extends about an
3 opening, the interior contour having a first segment that is
4 defined by a first radius that is rotated about a first origin
5 within the opening, and at least one second segment that is
6 defined by a second radius that is rotated about a second origin
7 within the opening.

1 2. The snap ring of claim 1, wherein the radial reach of
2 the second radius exceeds the radial reach of the first radius
3 at least at one point on the interior contour.

1 3. The snap ring of claim 1, wherein the first origin and
2 the second origin are not coincident.

1 4. The snap ring of claim 1, wherein the first segment
2 amounts to at least 50% of the interior contour.

1 5. The snap ring of claim 2, wherein the first segment
2 joins the second segment without a distinct radial step
3 discontinuity.

1 6. The snap ring of claim 2, wherein the radial reach of
2 the second radius exceeds the radial reach of the first radius
3 by a non-zero amount at least at one point within a region of
4 the interior contour where contact with another solid object
5 occurs during installation of the snap ring.

1 7. The snap ring of claim 6, wherein said interior
2 contour has a first interior edge bordering a first face of the
3 snap ring and a second interior edge bordering a second face of
4 the snap ring, the first interior edge having a cross-sectional
5 profile that includes die roll, and the second interior edge
6 having a cross-sectional profile that is blunted at least at a
7 location within said region.

1 8. The snap ring of claim 6, further comprising at least
2 one tooling hole, and wherein said amount is small enough that
3 the resulting ratio of the cubed width of the snap ring measured
4 at said point divided by the distance between the contacting
5 region and said tooling hole, is at least half of the minimum
6 ratio of the cubed width of the snap ring measured at any other
7 place on the snap ring divided by the distance from said place
8 to said tooling hole.

1 9. The snap ring of claim 7, wherein said blunted cross-
2 sectional profile is a rounded profile.

1 10. The snap ring of claim 7, wherein said blunted cross-
2 sectional profile is a beveled profile.

1 11. The snap ring of claim 9, wherein said rounded profile
2 is characterized by a radius of curvature that is chosen to be
3 in the design range of 40% to 85% of the thickness of the snap
4 ring.

1 12. The snap ring of claim 10, wherein said beveled
2 profile is characterized by a bevel angle that is chosen to be
3 in the design range of 10 to 40 degrees from the vertical axis.

1 13. The snap ring of claim 10, wherein said beveled
2 profile is characterized by a bevel depth that is chosen to be
3 in the design range of 60% to 85% of the thickness of the snap
4 ring.

1 14. An actuator arm assembly for an information storage
2 device, comprising:

3 an actuator; and

4 an actuator pivot bearing; and

5 a snap ring retaining the actuator pivot bearing relative
6 to the actuator, the snap ring comprising an interior contour
7 extending about an opening, the interior contour having a first
8 segment that is defined by a first radius that is rotated about

9 a first origin within the opening, and at least one second
10 segment that is defined by a second radius that is rotated about
11 a second origin within the opening.

1 15. The actuator arm assembly of claim 14, wherein the
2 radial reach of the second radius exceeds the radial reach of
3 the first radius at least at one point on the interior contour.

1 16. The actuator arm assembly of claim 14, wherein the
2 first origin is not coincident with the second origin.

1 17. The actuator arm assembly of claim 14, wherein the
2 first segment amounts to at least 50% of the interior contour.

1 18. The actuator arm assembly of claim 15, wherein the
2 first segment joins the second segment without a distinct radial
3 step discontinuity.

1 19. The actuator arm assembly of claim 15, wherein the
2 radial reach of the second radius exceeds the radial reach of
3 the first radius by a non-zero amount at least at one point
4 within a region of the interior contour where contact with
5 another solid object occurs during assembly.

1 20. The actuator arm assembly of claim 19, wherein said
2 interior contour has a first interior edge bordering a first
3 face of the snap ring and a second interior edge bordering a

4 second face of the snap ring, the first interior edge having a
5 cross-sectional profile that includes die roll, and the second
6 interior edge having a cross-sectional profile that is blunted
7 at least at a location within said region.

1 21. The actuator arm assembly of claim 19, wherein the
2 snap ring further comprises at least one tooling hole, and
3 wherein said amount is small enough that the resulting ratio of
4 the cubed width of the snap ring measured at said point divided
5 by the distance between the contacting region and said tooling
6 hole, is at least half of the minimum ratio of the cubed width
7 of the snap ring measured at any other place on the snap ring
8 divided by the distance from said place to said tooling hole.

1 22. The actuator arm assembly of claim 20, wherein said
2 blunted cross-sectional profile is a rounded profile.

1 23. The actuator arm assembly of claim 20, wherein said
2 blunted cross-sectional profile is a beveled profile.

1 24. The actuator arm assembly of claim 22, wherein said
2 rounded profile is characterized by a radius of curvature that
3 is chosen to be in the design range of 40% to 85% of the
4 thickness of the snap ring.

1 25. The actuator arm assembly of claim 23, wherein said
2 beveled profile is characterized by a bevel angle that is chosen
3 to be in the design range of 10 to 40 degrees from the vertical
4 axis.

1 26. The actuator arm assembly of claim 23, wherein said
2 beveled profile is characterized by a bevel depth that is chosen
3 to be in the design range of 60% to 85% of the thickness of the
4 snap ring.

1 27. A snap ring, comprising:
2 a ring having an interior contour extending about an
3 opening, the interior contour having a first segment that is
4 defined by a first radius that is rotated about a first origin,
5 and means for spreading physical contacts between said interior
6 contour and a solid object with cylindrical cross-section
7 inserted into the opening.

1 28. A method for assembling an actuator arm assembly in an
2 information storage device, comprising:
3 fabricating a stamping die punch having an edge with a
4 first segment that is defined by a first radius that is rotated
5 about a first internal origin, and at least one second segment
6 that is defined by a second radius that is rotated about a

7 second internal origin, the radial reach of the second radius
8 exceeding the radial reach of the first radius at least at one
9 point on the contour; and

10 stamping an interior contour in a metal sheet to create an
11 opening for a snap ring, using said stamping die punch.

1 29. The method of claim 28, further comprising blunting an
2 interior edge of said interior contour that lacks die roll from
3 said stamping.

1 30. A die for stamping an interior contour in a snap ring,
2 comprising:

3 a punch having an edge with a first segment that is defined
4 by a first radius that is rotated about a first internal origin,
5 and at least one second segment that is defined by a second
6 radius that is rotated about a second internal origin, the
7 radial reach of the second radius exceeding the radial reach of
8 the first radius at least at one point on the contour.